Lumbar – Minimally Invasive Approach (TLIF)

A transforaminal lumbar interbody fusion (TLIF) is performed to remove a portion of a disc that is the source of back or leg pain and fuse the spine. Like the PLIF (posterior lumbar interbody fusion) procedure, bone graft is used to fuse the spinal vertebrae after the disc is removed. However, the TLIF procedure places a single bone graft between the vertebrae from the side, rather than two bone grafts from the rear as in the PLIF procedure. In patients with spinal instability, instrumentation is used to help stabilize the spine during the bone graft fusion. Using a technique known as minimally invasive surgery, this procedure can be done with a much smaller incision than traditional open spinal surgeries and decreases damage to the low back muscles.
Introduction
A transforaminal lumbar interbody fusion (TLIF) is performed to remove a portion of a disc that is the source of back or leg pain and fuse the spine. Like the PLIF (posterior lumbar interbody fusion) procedure, bone graft is used to fuse the spinal vertebrae after the disc is removed. However, the TLIF procedure places a single bone graft between the vertebrae from the side, rather than two bone grafts from the rear as in the PLIF procedure. In patients with spinal instability, instrumentation is used to help stabilize the spine during the bone graft fusion. Using a technique known as minimally invasive surgery, this procedure can be done with a much smaller incision than traditional open spinal surgeries and decreases damage to the low back muscles.

Accessing the Spine
A short incision, approximately 2.5 cm. (1 in.), is made to the side of the middle of the lower back. A device that projects live X-ray images onto a screen, called a fluoroscope is typically used to pinpoint the exact position on the spine where the surgery will be performed. Next, a thin wire or needle is inserted through tissues and muscle to the level of the spine. Special dilators are guided down the wire to separate muscle fibers and provide access to the underlying spine without cutting through the muscles. After the initial dilator is docked on the back of the spine, larger dilators are added, gradually increasing the diameter to allow enough room for the surgical procedure.
Retractor and Instrument Set Up
A retractor device that can expand the surgical field and hold back the muscle is placed over the dilators. The dilators are removed and a lighting component is attached to illuminate the surgical field. A hex screwdriver is used to open the retractor blades, holding the soft tissue out of the way. The surgical exposure is now complete. An endoscope or microscope is then added to the edge of the retractor to provide close-up imagery on a screen to help guide the procedure.

Accessing the Disc
Through the opening in the retractor, the surgeon is now able to remove the entire facet joint in order to allow access to the disc. Removing bone here allows the surgeon to access the disc.

Excision
A grasping instrument is used to remove most of the intervertebral disc. Removing the facet joints and disc relieves pressure on the spinal nerves.
**Graft Placement**
A single bone graft is placed in the disc space from the lateral (side) aspect through the area exposed where the facet joint was removed. The bone graft will provide stability to the spine when it fuses with the vertebrae above and below it. In variations of this procedure, spacers, cages packed with graft material, or ground bone graft material may also be packed into the disc space to aid with the fusion.

**Instrumentation**
Next, the vertebrae are prepared for instrumentation. A sharp awl is used to make holes in the pedicles for insertion of pedicle screws. A guide wire is positioned in the holes and screws are placed over the guide wire and screwed into the pedicle. After the screws have been placed, the guide wire is removed. Next, a rod is positioned between the screws and fastened in place. The rod and screw instrumentation provides stability to the spine and prevents the vertebrae from moving while the bone graft fusion takes place.

**Summary**
The Minimally Invasive Surgery (MIS) approach to the TLIF procedure can be safely performed with little trauma to the surrounding low back muscles. MIS procedures may result in less postoperative pain, shorter hospitalizations, and quicker patient recovery than traditional open surgical methods.